REMARKS

I. Summary of Interview

During a telephonic interview the Applicants' attorney and the Examiner discussed the feature of the injection of a heated metal slurry into a formation that defines fins under a predetermined pressure to substantially simultaneously form the fins. Support for this feature can be found at least on page 16, lines 11-19. The patentability of this feature over the cited references is discussed below.

II. The Rejections Under 35 U.S.C. §103

(i) claims 1-8 and 19

Claims 1-8 and 19 were rejected under 35 U.S.C. §103(a) based on the combination of U.S. Pat. No. 4,344,477 to Miki et al ("Miki") in view of U.S. Pat. No. 5,040,589 to Bradley et al ("Bradley"). Applicants respectfully disagree and traverse these rejections for at least the following reasons.

Neither Miki nor Bradley disclose the features of: (a) injecting a heated metal slurry into a formation that defines fins under a predetermined pressure to *substantially simultaneously form the fins*; and (b) cooling the heated metal slurry to *form a contact area that provides a substantially continuous void free interface* between the core object and the fins when hardened for effective heat transfer across the contact area, as in claim 1. In fact, both Miki and Bradley

appear to be silent with respect to such features. More particularly, neither one appears to disclose methods where a plurality of fins (or other components) are formed simultaneously, and where an interface between the fins and core object forms a continuous void free interface that allows for effective heat transfer.

What is more, the Applicants respectfully submit that this combination is improper because the Examiner has not articulated any rational underpinnings to support a motivation to combine Miki and Bradley (see, e.g., *KSR International Co. v. Teleflex, Inc.*, 82 USPQ2d 1385 (2007)).

In the Final Office Action the Examiner acknowledges that neither Miki nor Bradley discloses the formation of a substantially continuous void free interface between a core object and a metal slurry. Nonetheless, the Examiner states that the combination of Miki and Bradley "...is expected to have a substantially void free interface". Such a statement does not amount to the requisite "rational underpinnings" required by *KSR*. Instead, it appears to be classic hindsight interpretation of the claims which, as the Examiner knows well, is impermissible.

Instead, the Applicants believe that one skilled in the art would not have been motivated to combine the teachings of Miki and Bradley because the thixotropic slurry of Bradley has a higher viscosity than the molten metal of

Miki (*see*, e.g., the paragraph bridging columns 13-14 of Bradley). It is this difference in viscosity which would have discouraged, not encouraged, one skilled in the art to combine Miki and Bradley to create a substantially continuous void free interface, as set forth in the claims.

Further, Miki provides insufficient motivation to use a thixotropic metal because the higher viscosity metal would have less flowability to form the contact area that provides the substantially continuous void free interface. As such, there is no predictable solution or common sense result of forming a substantially continuous void free interface by combining the teachings of these references as also required by *KSR*.

In rebuttal, the Examiner states that the injection of a semi-solid slurry into a casting die to unite a perform object is known in the art. However, the claims are directed to the creation of a substantially continuous void free interface between a core object and a metal slurry, not just the unification of a perform object.

The Examiner also appears to argue that the formation of the claimed structure that includes fins would require no more than "routine experimentation". This too does not suffice to meet the "rational underpinnings" required by *KSR*. To the contrary, the complete lack of a disclosure in any cited reference(s) of the claimed methods is a strong

indication of the patentability of the present claims. The Applicants request that the Examiner either submit an affidavit setting forth facts, rather than hindsight opinions, attesting to such routine experimentation or withdraw the rejections of claims 1-8 and 19.

Accordingly, the Applicants respectfully request withdrawal of the rejections and allowance of claims 1-4, 6-8 and 19.

(ii) claims 9-16 and 20

Claims 9-16 and 20 were rejected under 35 U.S.C. §103(a) based on the combination of Miki, Bradley, and U.S. Pat. No. 3,841,390 to DiBenedetto et al ("DiBenedetto"). Applicants respectfully disagree and traverse these rejections for at least the following reasons.

Similar to the rationales set forth above, neither Miki nor Bradley. taken separately or in combination, discloses the features of: (a) injecting a heated metal slurry into full mold cavities under a predetermined pressure to *substantially simultaneously form fins*; and (b) cooling the heated metal slurry to *form a contact area that provides a substantially continuous void free interface* between a core object and the fins when hardened for effective heat transfer across the contact area, as in claim 9.

In addition, there is insufficient motivation to combine Miki and Bradley as discussed above. DiBenedetto does not make up for these deficiencies.

Yet further, the Applicants note that the combination of DiBenedetto, Miki and Bradley is impermissible because such a combination would render one or more of these references unsatisfactory for its intended purpose.

For example, the vulcanized rubber belts discussed in DiBenedetto are not suitable to be used at the pressures and temperatures disclosed in Miki and Bradley without losing their structural integrity.

More specifically, DiBenedetto discloses a casting machine 10 that includes closed loop belts 32 and 33 made from vulcanized rubber to form a series of casting pieces attached to a runner casting 114 (see columns 2-4 and FIGS. 4-5).

In comparison, Miki discloses a die casting machine operating at 650° C. at 200 – 1000 kg/cm^2 (*see*, e.g., column 6) while Bradley discloses operating temperatures greater than 600° C. at a pressure of 1850 psi (see, e.g., columns 6 and 8). One skilled in the art would recognize that, in all likelihood, DiBenedetto's vulcanized rubber belts are not suitable for use at the pressures and temperatures disclosed in Miki and Bradley. Thus, any attempt to combine the references proposed by the Examiner would render DiBenedetto unsatisfactory for its intended purpose.

In rebuttal the Examiner argues that DiBeneddetto, in introductory remarks, states that casting machines with metallic belt-mold sections are known in the art. It is respectfully submitted that the Examiner misses the point.

The present claims do not include the feature of metallic belt-mold sections so it is immaterial as whether DiBenedetto indicates whether such structures are well known. What is material is what DiBenedetto uses in its disclosed methods. It does not disclose the use of machines that make use of metallic belt-mold sections. Instead, it discloses the use of machines that use vulcanized rubber belts. Because of this, one skilled in the art would not be motivated to combine DiBenedetto's methods with Miki and Bradley because such a skilled person would readily recognize the inherent danger in doing so because any resulting machine could not operate at the pressures and temperatures disclosed in Miki and Bradley without losing their structural integrity (i.e., any such combination would render DiBenedetto's methods inoperable).

Accordingly, the Applicants respectfully request withdrawal of the rejections and allowance of claims 9-12, 14-16 and 20.

III. Information Disclosure Statement (IDS)

Applicants thank the Examiner for returning an initialed copy of the second page of the PTO-1449.

Conclusion:

For all of the above stated reasons, reconsideration and withdrawal of the outstanding rejections and favorable allowance of all claims in the instant application are earnestly solicited.

In the event that there are any outstanding matters remaining in the present application, the Examiner is invited to contact John E. Curtin at 703-266-3330 to discuss this application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 50-3777 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Very truly yours,

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